MAY, MDCCCLVIII.

# THE ZOOLOGIST:

A

POPULAR MONTHLY MAGAZINE

OF

NATURAL HISTORY

AND

JOURNAL FOR RECORDING FACTS & ANECDOTES

RELATING TO

QUADRUPEDS, BIRDS, REPTILES, FISHES, ANNELIDES,
INSECTS, WORMS, ZOOPHYTES, &c.

THEIR HABITS, FOOD, RETREATS, OCCASIONAL APPEARANCE,
MIGRATIONS, NESTS AND YOUNG.

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almost always without their legs. Mr. Wallace's skins, however, are perfect, and in the highest possible condition: they comprise not only adult males and females, but young birds in various stages of development. Mr. Gould remarked that the Ornithology of the Aru Islands, like that of New Guinea, partook more of the character of the Australian Fauna than of any other. The woodpeckers (*Picidæ*) and hornbills (*Bucerotidæ*), so common in India and the Indian Islands, are totally wanting, while the honeyeaters (*Melaphagidæ*) and kingfishers (*Halcyonidæ*) are very numerous: on the other hand, the collection did not contain a single Malurus or any of the finches, forms represented by numerous species even in the northern parts of Australia. Mr. Gould, in remarking upon the beautiful plumes which adorn the Paradiseæ, stated that he considered they were assumed, or are in their most perfect state, just prior to the breeding-season, and that the bird was then adorned in its greatest beauty,—a beauty apparently assumed not only for the purpose of attracting the females, but to exhibit to each other their gorgeous finery, when they assemble and perform many curious and extraordinary evolutions. In South America the cock of the rock (*Rupicola*) has many singular habits at the like season, while in Australia the bower birds attract every one by the curious structures they make for a similar purpose. Mr. Gould instanced also the peacocks, the turkey, and the well-known ruff of the British Islands, as birds which assemble and make such displays.

Mr. G. R. Gray communicated a paper, containing a list of the birds, with descriptions of the new species, obtained by Mr. Wallace in Kè and Aru Islands. The collection consisted of 121 species of birds (showing great perseverance and energy on the part of Mr. Wallace), many of which were new and highly interesting species, and it also exhibited the sexes of several species that were hitherto unknown: Mr. Gray had therefore, in this paper, drawn up a list of them, with descriptions.

Mr. Sclater read notes on some birds from Southern Mexico, lately received by M. Edward Verreaux, of Paris, in which he made some remarks on specimens of such of the species as had not been included in his former lists, read before the Society, together with a few corrections as to statements made in his previous papers on the subject.

Mr. Sclater communicated a note on the skeleton of the sheathbill (*Chionis alba*), by Mr. T. C. Eyton.

The Secretary read a paper by Mr. W. Thompson, containing remarks on the British Actiniadæ, with a proposed rearrangement of the genera.

The Secretary also read a paper on Nemophis, a new genus of riband-shaped fishes, by Dr, Kaup, of Darmstadt.

Dr. Gray read a paper containing observations on the genus Cuscus, with the description of a new species, characterized under the name of Cuscus Celebensis.

Dr. Gray read a second paper containing a list of Mammalia, sent from the Aru Islands by Mr. A. R. Wallace. Two new species were described under the following names:—Dactylopsila trivirgata and Myoictis Wallacei.

Dr. Gray read another paper, on Aphrocallistes, a new genus of Spongiadæ, from Malacca: the type, which he named Aphrocallistes Beatrix, was received in 1842 from Capt. Sir Edward Belcher. Dr. Gray also read a description of Aphrocerus, a

BRITISH MUSEUM

new genus of calcareous Spongiadæ, brought from Hong Kong by Dr. Harland: the type specimen was named Aphrocerus alcicornis.

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*Tuesday, March* 9, 1858.—Dr. Gray, F.R.S., V.P., in the chair.

The Secretary read a monograph of the genus Miniopteris, by R. F. Tomes, Esq., in which a new species was characterized under the name of M. Australis. It was not until after he had arranged and named the specimens in the British Museum and other collections that Mr. Tomes found this species to be an inhabitant of Timor (and probably other of the islands of the Indian Archipelago) as well as of Australia, and that therefore the name of Australis was not strictly appropriate; but, to avoid the confusion which might possibly arise from a change of name, he thought it desirable that it should remain unaltered.

Mr. Sclater, at the request of Mr. J. H. Gurney, exhibited some interesting specimens from the fine collection of rapacious birds belonging to the Norwich Museum, and characterized two of them as new, under the names Buteo zonocercus and Scops usta, the former being from Guatemala, the latter from Ega, on the Upper Amazon, where it was collected by Mr. Bates.

The Secretary also read papers by Mr. H. Dohrn, Mr. Mörch and Mr. Hanley, describing various new species of shells, principally in the Cumingian collection.

The Secretary likewise read a paper by A. Leith Adams, M.B., Surgeon 22nd Regiment, "On the Habits, Haunts, &c., of some of the Birds of India." Throughout this very interesting paper Dr. Adams gave only the result of careful examination and experience, no species being named whose identity he had not confirmed; such as are doubtful he had left unnamed and had given a description shortly after death.

Dr. Gray read a paper "On the power of dissolving Shells possessed by the Bernhard Crab." In a note to his paper "On the Formation and Structure of Shells," in the 'Philosophical Transactions' for 1833, he stated it as probable that some Bernhard crabs had the faculty of dissolving shells, it not being unusual to find the long fusiform shells which are inhabited by these animals with the inner lip and a great part of the pillar on the inside of the mouth destroyed, so as to render the aperture much larger than usual. Dr. Gray, having continued his observations on these shells, was quite convinced that certain species of Bernhard crab (*Pagurus*) have this power, some possessing it to a much greater degree than others.

Dr. Gray read a second paper, intituled "Proposal to separate the Family of Salamandridæ, *Gray*, into two Families, according to the form of the skull." —*D. W. M.*

## *On Reason and Instinct.* By the Rev. J. C. Atkinson, M.A.

In my first paper on "Reason and Instinct" (Zool. 2333) I gave definitions of these two essences or qualities, as follows: "In the first place, as to Reason. 'The perception of truth, as it is in itself, is commonly ascribed to our rational faculties; and these have, by Locke and others, been reduced to two, reason and judgment. The former is said to be conversant about certain truths, the latter chiefly about probabilities.' Dr. Reid says, 'We ascribe to reason two offices or two degrees: the first is, to judge of things self-evident; the second, to draw conclusions that are not self-evident from those that are.' Secondly, as to Instinct. Instinct is a 'certain power or disposition of mind, by which, independent of all instruction or experience, without deliberation and without having any end in view, animals are unerringly directed to do spontaneously whatever is necessary for the preservation of the individual or the continuation of the kind.' 'Instinct,' writes the author of 'Ancient Metaphysics,' 'is a determination given by Almighty wisdom to the mind of the brute to act in such or such a way, upon such or such an occasion, without intelligence, without a knowledge of good or evil, and without knowing for what end or purpose he acts.' One more quotation, which serves, as it were, to bring together and contrast these two sets of definitions, and we will be content. 'Actions performed with a view to accomplish a certain end are called rational actions, and the end in view is the *motive* to their performance. Instinctive actions have a *cause*, viz., the internal impulse by which they are spontaneously performed; but they cannot be said to have a motive, because they are not done with a view to consequences. Thus a man gives charity in order to relieve a person from want; he fights for his country in order to repel its enemies. Each of these actions is performed from a motive, and therefore they are rational actions. An infant is impelled to suck the breast, but he knows not that it is necessary for his preservation: it is an action that has no motive, and therefore is not rational; but, as it is performed by a spontaneous exertion of the infant, it is not to be attributed to mere mechanism. It is, therefore, an instinctive action.'" And then, in a note, I add, "The action of breathing is mechanical, being performed without either motive or spontaneous exertion."

To the definitions here laid down I endeavoured to adhere, and I think not without success, in the paper from which I have extracted them, and no less in that which was published in two parts last year (Zool. 5452 and 5565). I had once thought of prefixing at least a part of these definitions to the second paper; and possibly I misjudged in not doing so, seeing so considerable a space of time had elapsed since the publication of the first paper; not that, if I had done so, I should have obviated all Mr. Tagart's criticisms * (Zool. 5737), or perhaps any considerable portion, but at all events the subject might have been rendered clearer to those readers who had not my first paper to refer to.

With deference to Mr. Tagart, I venture to think the definitions just quoted are sufficient for the purpose of a writer, who makes no claim to be considered scientific, in a 'Popular Magazine of Natural History.' I am not careful to contend with him whether Instinct and Reason are or are not "terms of ignorance." I submit that if we take the former to imply the origin, in the brute, of action upon ideas implanted by the Creator in its mind, and independently of experience, of instruction, of deliberation, of any distinctly proposed end in view,—and this is what our definitions convey,—"we know," quite well enough, "what we are talking about," when we use that term, to hope that our inquiries or discussions on the subject involved may lead to some practical result. We talk of electricity or the electric fluid; we talk, too, of magnetism or the magnetic fluid: are not both Electricity and Magnetism as much "terms of ignorance" † as Instinct or Reason? What do we know of either that we cannot, after the same manner, predicate of Instinct? In either case we observe certain phenomena; we observe, further, that these phenomena recur in obedience to certain laws: the former testify to the existence of a

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* The paper in question appears to have drawn forth notices from three contributors to the 'Zoologist.' That from the pen of Mr. Couch gives an explanation which, it appeared to him, was rendered necessary, by the form of my quotation from his book on Instinct. The other two are critical. Capt. Hadfield's stands first in order of time: the matter at issue between that gentleman and myself depends on the meaning of the phrase "information properly so called," and of the two words "allusions" and "references;" and therefore, as one good turn deserves another, to requite him for referring me to Montagu's 'Ornithological Dictionary,' I beg to refer him to any tolerable English Dictionary. With Mr. Tagart, who imposingly proclaims his "style and titles" as a "logician and metaphysician," and is therefore both champion and herald in his own single person, I must deal in the text.

† "We are totally ignorant . . . of the manner of the existence of electricity in bodies, whether it be a material agent, vibrations of ether, or merely a property of matter."—*Somerville's Physical Sciences*, 301. Precisely the same must be said of magnetism.—See *Id.* 342.

certain power, or property, or agent; the latter to some of the qualities or operations, or both, of such power, property or agent; but neither one nor the other, nor both together, reveals to us what electricity, what magnetism, really is: and just so it is with Instinct. We see the phenomena, and we see some of the laws under which they recur; but the rest is all surmise, except in so far as we know that the thing we mean is implanted by God the Creator in the living creature, just as we know the things we mean by electricity and magnetism are, by the same Mighty Hand, inseparably connected with the material creation at large. If men of science had been apt to say, "We must know what electricity *is* in amber, glass or silk,—what magnetism *is* in the loadstone,—before we can decide whether one or the other is to be found in metallic veins, in the rocks, in the earth at large, in the atmosphere," I fear we should now know very nearly nothing at all about either beyond the bare fact of their existence: in other words, such a proposition would have been not simply an unnecessary, but a fatal, obstacle to the acquisition of any sound or certain knowledge about either of those mysterious essences. I cannot, therefore, agree with Mr. Tagart, that "before we can decide whether animals have reason, we ought to know at least what it is in man," (Zool. 5738), any more than I can that we must know what Instinct essentially is before we can decide "how far animals, or creatures whom we are accustomed to speak of as guided by instinct,* are participants of reason" (Zool. 5737). I think that if all thoughtful men are agreed on what are to be considered unquestionable *indicia* of Reason, or signs and tokens of its exercise, it matters not, so far as our inquiry is concerned, what Reason essentially is, or whether it be assumed "to have its root in sensation" (Zool. 5739), or be considered as an emanation from the Divine Mind in the image of which we were created. Wherever I can succeed in tracing these *indicia* in any individual of the lower orders of animal creation,—to whatever extent they are discernible, whether simply so or to a high degree,—there, and to that extent, I believe, and I express my belief, that Reason, be it what it may in man, exists in the brute: and, in like manner, if I can succeed in distinguishing and defining what are the marks of Instinct, the signs and tokens of its presence and operation, without any attempt at a metaphysical determination of what that essence or quality really is, and without running the risk—which I very likely should run if I made the attempt—of making words my masters instead of my servants, I think I am in a position for carrying on an inquiry which depends, in no very perceptible degree, upon anything but observed phenomena and logical reasoning upon such phenomena.

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* I should say Horne Tooke would express no obligation to Mr. Tagart for making him out (Zool. 5737) so great a blockhead or so poor a Latin scholar. But instead of giving any comment of my own on Mr. Tagart's derivation of Instinct, "after Horne Tooke," I prefer subjoining the comment of an etymological friend of mine. He says, "His *in*, *tinctus*, is the veriest school-boy folly. *Instinguo* is identical in root with *instigo*, and the root is that of our 'stick,'—Greek στίζω, στίγμα, &c. The exact definition of any word, I am inclined to hold, may be taken from its true etymology; and hence you would define *In-stinct* to be an *inward pricking* or *goading*, or something which *sticks into you* within, like a spur. To 'distinguish' is to mark out, or separate things from each other by points,—to divide into στίχη or rows: compare 'distich.' As an illustration of this sense of sticking or pricking, you will remember Falstaff and Justice Shallow, when the former is 'pricking' his men." See also Richardson's English Dictionary.

Before I proceed further, I may as well at once admit the justice of Mr. Tagart's criticism on the expression "Instincts peculiar to man," and on the use of the word Instinct in the plural; so far, that is, as such use "implies that there are many different kinds of instinct." The expression was employed inadvertently, and overlooked in revision. What I meant and what I ought to have said was, "the instincts in which man is a participant;" and it would doubtless have been more correct—and, possibly, more pedantic as well—to have said, all through, "an operation of Instinct" instead of "an instinct," and "operations of Instinct" instead of "instincts," however much ordinary use may seem to excuse, or even to require, such want of precision. Perhaps, after this admission, I may be allowed to ask how came Mr. Tagart, who assumes to be "a logician and metaphysician," when he flings his stone at my window and breaks his pane, to forget the vitreous composition of his own domicile so far as to confound "elements" and "operations"? (Zool. 5742). Surely these are not synonymous or convertible terms; at least I, who do n't set up as logician and metaphysician, did not use them as such; on the contrary, I always thought they stood for things, or represented ideas, very essentially distinct and different. Methinks it would sound strange to talk of hydrogen and oxygen as the "operations" of water, or of a thorough good drenching as being the "element" of a sufficiency of that fluid properly applied. I might gratify the love of mischief, which is a sort of "instinct" in so many of us, by another "shy" or two at Mr. Tagart's "house," and chuckle as I heard the smash ensuing; but I would fain turn to something, less amusing it may be, but at the same time, I would hope, less unprofitable.

I am quite aware that there is a difficulty in the application of the word Reason in our inquiry; but it does not appear to me that Mr. Tagart's remarks are at all intended to apply to that difficulty. It is of course obvious that there is an immense difference, not only between the highest exercise of reason in the brute and the same in man, but between the lowest and the highest operations of reason in any highly intellectual human creature: and this has led to the desire and the effort, in more than one powerful and metaphysical thinker, to restrict the use of the word Reason to those of man's intellectual powers capable of the highest exercise, proposing to designate the other and lower by the term Understanding. In this sense they deny that brutes have Reason at all; and, admitting that they have understanding, yet do not admit even this in the same sense in which they speak of the human understanding, but allege that the brute understanding is a merely instinctive understanding, or a necessary development of the powers of Instinct under certain contingent laws, but determinable by the nature and habits of the animal itself. While holding different views on this latter point—and I shall presently seek to show the grounds of my dissent—I am ready most freely to admit that it is highly desirable to assert the vast distinction between what they severally designate as Reason and as Understanding: yet, as it appears to me, there are peculiar difficulties in the way of attempting to do so by the appropriation of the word Reason to man's highest intellectual power; one of which is this, that while we should have two nouns, Reason and Understanding, standing for things very widely distinct, we should have but the one verb, 'to reason,' to denote the distinct action of each of the essences designated; and not only so, but that this verb would be fully as appropriate when applied in connexion with that noun to which it is not paronymous, nor indeed even homologous, as when used in connexion with its conjugate; so that if we wished to speak of the exercise, by the brute animals, of the intellectual faculties they are admitted to possess, while, by what we may term verbal necessity, we should have to say that they are able to reason and often do reason, we must yet by the definition deny to them any possession of the faculty of Reason. This difficulty is more clearly seen by a reference to the definitions these writers give of Reason and Understanding, which they assert to be "distinct in kind." The latter, they say, is "the faculty judging (that judges) according to sense" (Coleridge, 'Aids to Reflection,' i. 168); the former, "the power of universal and necessary convictions; the source and substance of truths above sense, and having their evidence in themselves;" or, "the source of necessary and universal principles, according to which the notices of the senses are either confirmed or denied." (*Id.* i. 181). And there is this further difficulty, that the immense majority of mankind will, according to the strict definition, be cut off from all but a nominal possession and exercise of Reason. For my own part, therefore, I should be disposed, in preference, to use distinctive terms applied to the word Reason itself; thus, the Higher Reason or Pure Reason (Kirke's 'Physiology,' 452), and the Lower Reason or Natural Reason; which latter, in the words used by Archbishop Leighton and commented on by Coleridge, is the faculty that is said to "judge according to sense." And so I should feel justified in the use—objected to by Mr. Tagart—of such expressions as "the degree or kind of exercise of Reason from its simplest manifestation to its more complicated operation."

Next I proceed to notice the accounts or definitions of Instinct given by these writers. "The word Instinct brings together a number of facts into one class by the assertion of a common ground, the nature of which ground it determines negatively only,—that is, the word does not explain what this common ground is, but simply indicates that there is such a ground, and that it is different in kind from that in which the responsible and consciously voluntary actions of men originate. Thus, in its true and primary import, Instinct stands in antithesis to Reason; and the perplexity and contradictory statements, into which so many meritorious naturalists and popular writers on Natural History have fallen on this subject, arise wholly from their taking the word in opposition to Understanding."—('Aids,' i. 190, note.) This passage is extracted from a note appended to a series of remarks on a portion of a Lecture delivered at the Royal College of Surgeons, by Mr. Green, Professor of Anatomy. "In explaining the nature of instinct," Mr. Coleridge says, "as deduced from the actions and tendencies of animals successively presented to the observation of the comparative physiologist in the ascending scale of organic life—or rather, I should have said, in an attempt to determine that precise import of the term which is required by the facts—the Professor explained the nature of what I have elsewhere called the adaptive power, that is, the faculty of adapting means to a proximate end,—I mean here a relative end,—that which relatively to one thing is an end, though relatively to some other it is in itself a mean. . . . I give as the generic definition of adaptive power, the power of selecting and adapting means to proximate ends; and, as an instance of the lowest *species* of this *genus*, I take the stomach of a caterpillar: I ask myself under what words I can generalize the action of this organ, and I see that it selects and adapts the appropriate means (that is, the assimilable part of the vegetable *congesta*) to the proximate end, that is, the growth or reproduction of the insect's body. This we call vital power, or *vita propria* of the stomach, and this being the lowest *species* its definition is the same with the definition of the kind. Well! from the power of the stomach I pass to the power exerted by the whole animal: I trace it wandering from spot to spot, and plant to plant, till it finds the appropriate vegetable; and again, on this chosen vegetable, I mark it seeking out and fixing on the part of the plant—bark, leaf or petal—suited to its nourishment; or (should the animal have assumed the butterfly form) to the deposition of its eggs and the sustentation of the future *larva*. Here I see a power of selecting and adapting means to proximate ends, according to circumstances; and this higher species of adaptive power we call Instinct. Lastly, I reflect on the facts narrated and described in the preceding extracts from Hüber" (of bees supporting a tottering piece of comb until effectually propped by pillars of wax, and ants constructing a passage or tunnel to an under-ground chamber), "and see a power of selecting and adapting the proper means to the proximate ends, according to varying circumstances. And what shall we call this yet higher species? We name the former Instinct; we must call this Instinctive Intelligence. Here then we have three powers of the same kind, life, instinct, and instinctive intelligence; the essential characters that define the *genus* existing equally in all three." I pause here for a moment, to ask, if this be so, ought not these three powers to be severally termed Organic or Vegetative Instinct, Animal Instinct, and Intelligent Instinct, rather than Life, Instinct, and Instinctive Intelligence? The author continues, "But in addition to these, I find one other character common to the highest and lowest, viz. that *the purposes are all manifestly predetermined by the peculiar organization of the animals;* and though it may not be possible to discover any such immediate dependency in all the actions, yet the actions being determined by the purposes, the result is equivalent; and *both the actions and the purposes are all in a necessitated reference to the preservation and continuation of the particular animal or the progeny.*"—(*Id.* i. 190, 192.)

I have not space for lengthened comments on the foregoing, but I must demur to the statements in the italicised portions. I do not think that, as to very many recorded instances of brute intelligence, these statements can be made with truth. They are not true as applied to several of the few instances I adduced in my former paper on this subject; and, what is remarkable, the author, in effect, goes on in the succeeding paragraph, to say there are many recorded actions of animals which cannot be consistently set down under the category he proposes, viz. the "extraordinary" but "numerous and well-authenticated actions of dogs for the preservation of their masters' lives, and even for the avenging of their deaths. In these instances we have the third *species* of the adaptive power in connexion with an apparently moral end—with an end in the proper sense of the word. Here the adaptive power co-exists with a purpose apparently voluntary, and the action seems neither predetermined by the organization of the animal, nor in the direct reference to his own preservation, nor to the continuance of his race. . . . This, I admit, is a problem of which I have no solution to offer."—(*Id.* i. 195). This problem or difficulty, it certainly does seem, arises simply from, so to speak, stretching Instinct until it ceases to be instinctive and becomes rational. As Professor Green says, after speaking of Hüber's Bees (*Id.* ii. 9), "Here we are puzzled; for this becomes understanding." It *is* a puzzle, and the thing referred to *is* understanding. But the puzzle is avoided (though not in Professor Green's way), and the problem ceases to be a problem by letting Instinct be what its derivation makes it and our definitions describe it as being, and by letting whatever else in the list of an animal's actions there may be, which cannot be bounded and delineated by those definitions, be termed rational or intelligent, or described as due to Reason—albeit to Reason, as we are ready to admit—in its lower sense or degree. At all events this seems to be better and more consistent, with both fact and reason, than the conclusion adopted by Professor Green, that "though instinct is not the same and identical with the human understanding, the difference is not in the essential of the definition, but in an addition to or modification of that which is essentially the same in both:" or, as it stands in Coleridge's words, "that if I suppose the adaptive power in its highest *species*, or form of instinctive intelligence, to co-exist with reason, free will and self-consciousness, it instantly becomes understanding; in other words, that understanding differs indeed from the noblest form of instinct, but not in itself or in its own essential properties, but in consequence of its co-existence with far higher powers of a diverse kind in one and the same subject. Instinct in a rational, responsible and self-conscious animal, is understanding."

It scarcely would seem to me that the doctrine that man is moved or influenced by Instinct, that he is a participant in Instinct, or in the possession of Instinct, is one which calls for elaborate proof; or that the language which speaks of him as a creature of Instinct, or of his instinctive qualities or processes, or of his various instincts,—except in so far as this latter expression is open to the emendation admitted above,—calls for systematic defence, except on the ground that Mr. Tagart "objects" to both the one and the other: but having to maintain that doctrine, and being inclined to adopt this language, I should be disposed to distinguish carefully between mere desires and true Instincts or operations of Instinct.

To make one more special reference to Mr. Tagart's paper. He writes (Zool. 5743), "Say, if you please, with Sir B. Brodie, that 'the desire to live in society is as much an instinct in man as it is in the bee, the ant, the beaver, or the prairie-dog;'* but it is no more so. It is no more an instinct than any other desire, than all desire, the desire to sit, lie or sleep when weary, to eat when hungry, to drink when thirsty, to have more clothes or get nearer fire when cold: it is no more than saying that man is the creature of desire, or subject to desire, like all other animated beings. . . . Is there anything special in the desire to live in society to make it more than any other desires worthy the name of an instinct?" The answer to this question—and it is strange a logician did not foresee it—is only too easy after the admission in the first period of the passage just quoted. If the desire to live in society is as much an instinct in man as it is in any of the creatures named,—and it needs not to be more so,—there *is* something "special" in that desire to "make it worthy to be called an instinct;" and that something is this,—that it is not a mere simple *desire* in the case of either of the creatures named, or of any other of the social or gregarious animals. It is much more: it is a necessity; a desire or impulse which they cannot resist, which they most certainly never attempt to resist: in other words, it is "a determination given by Almighty Wisdom to act" in this particular manner, and no other: that is Instinct, or an impulse of Instinct.*

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* I append Sir B. Brodie's definition of Instinct. "Instinct is a principle by which animals are induced, independently of experience and reasoning, to the performance of certain voluntary acts, which are necessary to their preservation as individuals, or the continuance of the species, or in some other way convenient to them." —*Psych. Researches*, 187. And I add the following extract that the passage criticized by Mr. Tagart may be seen in connexion with its context. "Man could not exist as a solitary being. He has neither swiftness of feet nor any natural means of offence and defence, which would enable him to compete with the buffalo, the lion or the wolf. It would have been of little avail to him if the Creator had left it to himself to learn, by hard experience and any wisdom of his own, that he can procure his own safety and his means of subsistence only by associating with others. The desire to live in society is as much an instinct in him," &c.—*Id.* 196.

However, it is neither my wish nor intention to found much on an argument which, in a measure, may be said to be derived from an unwary admission. If man ever acts under or in obedience to the impulses of Instinct, a little careful observation and thought will, without doubt, soon render it apparent to any reasonable and candid person that the case is so. Now I think that the action of the infant, alleged as an illustration of instinctive actions in our definitions above given, is one which admits of no question as to its origin. No one would ever think of denying that the young animal of any other species save the human seeks its mother's dug by Instinct; and it is simply preposterous to set up a distinction between the act of sucking as done by a human infant and the same act as done by an infant brute. And be it observed that it is not a simple desire in this case: the desire of food may be felt, but it is something beyond the simple desire which prompts the seizure of the pap by the lips and all the complicated proceedings which constitute the act of sucking, as it is something beyond a simple desire which urges the just-hatched duckling into the water and prompts all the complicated proceedings which constitute the act of swimming. What the simple desire of food prompts to, as far as I have seen, is squalling in the infant and squeaking in the small pig.

Again, who doubts that if a male and female infant were thrown together on an otherwise uninhabited island, and, by a strange combination of circumstances,—neither unimaginable, however, nor unimagined,—were to arrrive at years of puberty, there would be a continuation of the human species in that island? Indeed I may distinctly state that I am in possession of facts relative to both sexes which establish, beyond all dispute, the existence of the sexual instinct—I repeat instinct, and not desire, the existence of which needs not to be established—in the human species.

Further, I might quote a hundred different instances in which animals,—the cat, the dog, the pig, the donkey, the cow,—having been transported to a distance (in some cases by the agency of their own limbs, in other cases in baskets, sacks, carriages, ships) from their accustomed place of habitation, have, on finding themselves at liberty, returned to their former home; very possibly taking long, toilsome journeys, and, in several cases, such as required other means of locomotion besides the animal's own for their accomplishment, before the return could be effected. No one disputes that this is done by Instinct, and indeed no one can, for there is no other explanation to be given. It is very wonderful and mysterious, but possibly not at all more so than what we see or may see almost every day, in a hundred different directions, if we have our eyes open. I refer to such things as the migration of various birds and beasts, the return of the bee to its hive,* and the like.

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* "The child is led to seek the society of other children, *by an impulse which he cannot resist*, and which is independent of any intellectual operation."—*Brodie*, 197.

Well! we go into the vast forests of North America, equally boundless, trackless, directionless: but the Red Man † will guide us to a point in any given direction, though he has never been there before; and, if we take him by a circuitous route to any given point, scores of miles distant, and never before visited by him, he will return by the chord of the arc, and without a hesitation or a deviation; and moreover I believe that in his case "it is" NOT "the peculiarity of man not only to be conscious of the ends which he pursues and of the methods by which he attains them, but to be able as well to give an account of these ends and means, *so as to instruct his fellows.*" (Zool. 5743.) It is said that he can give no explanation of the remarkable power of self-guidance he so unquestionably possesses. And it may be added, multitudes of instances, more or less analogous to this, from the habits and peculiarities of the Australian natives and other uncivilized or savage races, might be adduced. Will any one hesitate in affirming that Instinct—simple untutored Instinct—is the motive power and influential cause in all such cases as the one alleged?

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* In this moorland country it is customary, when the ling (Scottice, heather) is in bloom, for the keepers of bees to convey their hives to the close vicinity of the moors. You may sometimes see thirty or forty hives placed in some little enclosure connected with a cottage or other house just on the verge of the moor. This transportation, I hardly need say, is effected after nightfall, and the bees have "gone to bed." The next morning, after a little seeming "wonder where they have got to," they go about their business as usual, amid the new scenes and flowers and sweets,—and very powerful and delicious is the aromatic smell of the ling blossom on a fine sunny day in August,—and at the usual time return well laden, in their customary direct undoubting flight, to their comb, notwithstanding its new "whereabouts." The honey, I may add, is almost equal in flavour and scent to the renowned honey of Greece.

† "It is truly wonderful to witness the sagacity and unerring precision with which the Indian hunter can trace his route from one spot to another, no matter how great the distance may be, through the most dense forests, and over the most rough and broken country. It does not signify whether he has travelled through the same country before or not; he knows the direction, and that is sufficient. In his native forests he is never at a loss; walks evenly and softly at all times, as if he were on the trail; seldom speaks or makes a false step, or unintentionally breaks a branch."—*Hardy's Sporting Adventures in the New World*, i. 32. I quote from this book as it happens to be the volume at hand, but the facts adduced are testified to by many different authors. Again, "Many are the rules which I have heard laid down by white settlers for finding one's way through the woods." The writer then mentions two or three, such as noticing the bark on the trees, and being "guided by the mosses and lichens, which always grow thickest on the north side," or observing the "direction in which the top foliage of pines and the hackmatack grows: they will invariably be found pointing to the north-east," &c. &c. He then proceeds, "I have heard all these methods described as being resorted to by the Indians in finding their way, but I am confident that they do not use them. When I have mentioned them to an Indian, he has invariably laughed heartily, saying, 'Ingine no want look at bark or tree-top, 'cept when he hunt porcupine.'"—*Id.* 33, 35.

The instances which have been thus brought forward are instances of pure, simple Instinct, as operative in the human species; two of them illustrated in the experience of, it may be said, every individual in the species, the third only confined to the experience of the savage. And besides, it would be easy to adduce other instances, to almost any extent, as to which it would be very difficult to make good a negative to the question, Are not all these actions due *originally* to Instinct, however much that Instinct may have been restrained, directed, overruled, in its operation by Reason? and this, too, quite independently of all those many actions in every human creature's daily career of doing, which may be ascribed to what Mr. Couch describes as unconscious irritability; such, for instance, as the involuntary closing of the eye-lid at the sudden approach to the eye of any material object, and the like:* but the production of such instances is quite unnecessary for our purpose. Quite enough has been said to justify what my critic "objects to," *viz.* "the application of the term Instinct to man;" and, moreover, I shall have to revert to the subject in a future portion of the present paper.

J. C. ATKINSON.

Danby Parsonage, Grosmont, York,
March, 1858.

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* Dr. Carpenter terms such actions Consensual.

## *Notes on the Hedgehog.* By Major Spicer.

The following notes on the hedgehog may perhaps interest some of the readers of the 'Zoologist:'—

Saturday, July 8th. I this morning found a hedgehog, and with her four young ones, about the size of small oranges: I took them home, and placed them in the kitchen garden, the old one and young, making a sort of nest for them amongst some herbs. The old one soon seemed to recover her fright and hurts, for she had been much worried by a couple of terriers I had with me, till I discovered she had young ones with her, when I made them desist. I make a practice of killing all hedgehogs as vermin, being confident of their malpractices with regard to game. On visiting them the same afternoon I found the old one suckling her young, and I stood quietly by watching her for some time: she lay at full length on her side, or rather nearly on her back, for their convenience, just like an old sow with pigs in a sty, and the young ones worked away at her paps, smacking their lips, and making almost as much noise about it as young pigs would do: their cry when not suckling is a sort of continuous short whistle or chirp, like the cry of a bullfinch, and more like a small bird than an animal.

July 9. They were all in the same place, in the nest I had made for them: in the path near I had strewn, the night before, little bits of raw meat, and some of this was gone, but whether stolen by birds or eaten by the hedgehog or other vermin I could not say.

July 10. On looking at them in the morning the old one was not to be found, but the young ones were all right, and looking as snug as could be. On searching for the old one, I found a hole scratched under the garden fence, a wooden close paling, about ten yards from where the young ones were.

July 11. The old hedgehog still away, but the young ones looking well and sleeping contentedly, so that no doubt she returned in the night to suckle them, whereas had they been deserted and hungry they would have been restless and half-starved in the two nights. To ascertain whether she returned, I closed the hole under the fence loosely with earth.

July 12. The hole scratched open from the outside, and the young hedgehogs strong and well, but no old one to be found; she evidently returned to suckle them each night, and they lay sleeping as comfortably and as full as young sucking-pigs or puppies.

July 13. This morning three of the four young ones are gone, and the remaining one was baking in the sun in the centre of a broad gravel-path, which lay between the nest and the hole under the fence, the mother having evidently managed to carry off three, but, disturbed in her journey with the last, probably daylight overtaking her before she calculated. I returned it to its nest or hiding-place to see the result.

July 14. The remaining young one is gone, no doubt carried off by the old hedgehog.

The sequel is soon told: some few days afterwards my neighbour, a farmer, told me, as a remarkable circumstance, that a few mornings before, he and one of his men, about five o'clock, saw a large hedgehog, in his meadow adjoining mine, carrying a young one in its mouth from the direction of my garden. Between my meadow, which adjoined the garden and his, was a high bank and ditch, which she had therefore passed, and altogether she was, when seen by him, 100 yards from the garden fence: this was no doubt my hedgehog, in whom I had at last taken quite an interest: they watched her for some time, carrying the young one a "smartish way," as they called it, through the thick grass heavy with dew; every now and then she put the young one down and rested, and this she did many times, setting to work again at her task, and so interested was she in what she was doing that she took no notice of them, though close to her. She carried the young one in her mouth, having hold of it by the back of the neck, and her strength was such that she lifted it usually quite off the ground, and trotted rather than walked with it. I am sorry to say they ended by destroying them both.

This poor hedgehog had each night to feed herself, travel from her own hiding-place to her young, suckle them all, and lastly to transport them singly away to a place of safety; thus making three or four long journeys on the night she took them away, the nights being very short at this season of the year.

This is the amiable part of their character; but I must, from long experience of their habits, give but a very indifferent account of them as friends to the game preserver, though it was long before I would yield to the popular clamour against them. While on the subject of this hedgehog and her young ones, I will mention that, late on the evening that I had strewed the pieces of raw meat for her in the pathway, I found a large black slug feasting on a piece of raw mutton: there was no mistake about it, as I watched him for some time, and he stuck to it like a leech; I had no notion that these gentlemen were carnivorous, though it has struck me since that I have found slugs about garbage and dead animals.

A friend of mine, a good sportsman and close observer, has told me the following with regard to the hedgehog. He was one day passing under a rookery, and was attracted by a young rook on the ground, having fallen from its nest before it could fly, which was making a great noise, squalling most lustily, and on reaching the spot he found a hedgehog had got hold of him, having seized him by the back, and was mouthing and worrying him, and would no doubt soon have finished him had he not rescued him and destroyed the hedgehog. This anecdote seems to me to set at rest the long arguments *pro* and *con* which I have read, in the 'Zoologist' and elsewhere, as to whether hedgehogs are destructive to game or not: this was not an animal in confinement, debarred from his natural food, but, with all the world before him, he had chosen a fat young rook as a dainty morsel. I have over and over again caught them in traps baited with some dead animal, and set for vermin, and used to try and persuade myself that they had got there by accident, but I have since had too many proofs of their delinquencies.

The same person to whom I am indebted for the above also narrates the following. He found a hedgehog in a meadow, and to kill it he kicked it several times, when it uttered a cry, as he says, resembling a calf; so much so, that some cows in the meadow, who had before taken no notice of him or his proceedings, immediately came up and bellowed round him, and he fully thinks that they imagined he had a calf in some way near him, and he says that the cry, had he not known whence it proceeded, would have deceived him. Now possibly this will be ridiculed, and the peculiar tone emitted by the hedgehog may have been accidental; but there is no doubt of the fact, as my friend is by no means an imaginative person, but a very matter-of-fact one. Supposing the cry at that time to have been the natural cry of the hedgehog, has he the power of uttering it at pleasure, or are the strenuous kicks of my friend required to bring it forth? And can it be connected in any way with the old notion of their sucking cows? as, if they can make the cry at will, it would very much facilitate the operation. It is extraordinary how deep-rooted a prejudice this still is in the minds of country people, if prejudice it is: I confess I do not see the great improbability of it. The hedgehog has the power of stretching its neck a long way out from its body, as anybody who watches them running about of a summer's evening may remark for themselves, and we know how willing a cow is to be relieved of her burden of milk; indeed it is a most pleasurable sensation to her, and if, in addition, the hedgehog has the power of imitating the cry of a calf, it might induce a cow, when lying down, to bear a little punishment from its prickles for the pleasure of having her milk drawn from her. The hedgehog's fondness for milk is very certain, as I have constantly kept them on bread and milk, and they would refuse every other sort of food for it. However the case may be, it is very generally believed by the lower orders of the South of England.

Like other animals and birds, hedgehogs are occasionally albinos: I have a very large one stuffed, which is perfectly white, the hair of the lower part and legs, as well as the prickles of the back. The very young ones are always light-coloured.

JOHN SPICER.

Fowley, Liphook, Hants,
April 7, 1858.

*Note on the early breeding of Squirrels.*—On the 4th of March several squirrels, so young that they were not much bigger than a rat, and scarely fit to leave the nest, were running about upon the snow. It is a fable, which I had believed until I came here, that squirrels hybernate; here their footsteps are the first which mark the unsullied beauty of the snow.—*W. C. Hewitson; Oatlands, April* 10, 1858.

*Occurrence of the Peregrine Falcon in Yorkshire.*—A fine specimen of this bird was caught by a boy in a grass field at Thorne, on the 8th of February last, the bird having been shot at, but only winged, and is now in the possession of George Glennie, bird-stuffer.—*Joseph Richardson; Thorne.*

*Early appearance of the Hobby in Norfolk.*—A female hobby, in good plumage, was shot near this city on the 20th of March. This bird had evidently been fired at before, a portion of both mandibles having been broken, accounting for the sluggishness and lean condition of the unfortunate bird. On dissection, a pellet of feathers was found ready for excretion, showing that, even in its crippled condition, this hawk had succeeded in procuring a meal not long before. I have recorded this instance, as the hobby, a summer visitor to this country, almost invariably visits Norfolk in June; indeed, with the exception of one killed some years back, near Yarmouth, in February, I have never known one to appear earlier than the first week of that month.—*H. Stevenson; Norwich, April* 12, 1858.

*Early arrival of the Blackcap.*—On the 29th of March I heard the blackcap singing, ten days earlier than I ever heard it before.—*W. C. Hewitson; Oatlands, April* 10, 1858.

*Early nesting of the Longtailed Titmouse.*—On the 18th of March, last year, I traced some longtailed titmice to their nest by watching them carrying large white feathers from a neighbouring farm-house: it was in a bush of furze,—a situation which they seem to prefer,—and in a few days later the bird was sitting on its eggs. I have usually found the nest in June, and was therefore surprised to see it thus early.—*Id.*

*Does the Male Partridge assist in Incubation.*—I am not able to give the result of personal observation in reply to Major Spicer's inquiry (Zool. 6014), as to whether the male partridge assists the hen in the work of incubation; but I have a note, written in 1839, recording certain of the actions of a male partridge, and with that note is connected a distinct recollection that the observers added to the information recorded a further statement that the male bird did regularly take a part in covering the eggs, in the absence of his mate. The observers were the then rector of Great Braxted, in Essex, and a young man who lived with him; the latter having many opportunities, and using them, of making himself acquainted with the habits of the partridge and other game birds. The actions I adverted to were as follows: the partridge's nest was in the hedge of the pasture in front of the rectory, and during the time of incubation a rabbit very frequently came out to feed nearer the nest than the partridge approved: whenever this happened the male bird attacked the intruder with the partridge's equivalent to "tooth and nail," and always succeeded in driving him to a more respectful distance. I have no doubt that my friends were quite correct as to the sex of the champion, and the fact certainly proves that the male was in the close vicinity of the nest whenever the approach of the rabbit called for a display of his prowess, in defence of his wife *in esse* and children *in posse.*—*J. C. Atkinson; Danby, April* 3, 1858.

*Supposed Variety of the Partridge.*—With regard to the supposed variety of the partridge spoken of in the Rev. Mr. Atkinson's interesting and most valuable paper (Zool. 5982, at the bottom of the page), I can only say that, thirty years ago, we used to kill the variety spoken of, on Hindhead, and have always called them "little black heath-birds." They differ most essentially from the usual appearance of our birds, almost enough to be taken for another species. They are fully a third smaller in size, invariably of a blacker colour, and never frequent cultivated land; they feed on the tops of the heath, and, in the season, on the ripe fruit of the whortleberry, which is so abundant on Hindhead, and always called "hurts" by the country people. I have no doubt their dark colour is due, in some measure, to this food. One day I killed seven brace and a half of these little black fellows, all exactly alike, and full three miles from the nearest cultivated land.—*Waring Kidd; Ockford Road, Godalming; April* 13, 1858.

*Occurrence of the Little Bustard at Gorleston, Suffolk.*—About the 4th of March a female little bustard was shot in the Southdown Marshes, at Gorleston, near Yarmouth, and is now in the possession of J. H. Gurney, Esq., M.P. This bird was in fine condition, the stomach being filled with various kinds of green food; the ovaries, about the size of small pins' heads, were easily distinguishable, from their being perfectly white; the wind at the time this bird was killed, and for some days previously, was N.E.; the weather intensely cold, with snow on the ground; in fact, exactly such as we experienced in December, 1853, when the last Norfolk specimen (a male, in winter plumage) was obtained in nearly the same neighbourhood (Zool. 4253): at that time several other specimens were recorded as having occurred in various counties about

**the same date. It may not be uninteresting, in the case of so accidental a visitant to our coast, to enumerate, as far as possible, the portions of herbs and grasses which formed the contents of the stomach in this last instance. By far the larger portion consisted of a long fine grass, apparently from the marshes, having a brackish odour; and mixed with this, and matted together, was a species of Conferva from the ditches; two flowers of the common daisy (*Bellis perennis*) were plainly discernible, as also a narrow scolloped leaf, resembling cat's ear (*Hypochæris glabra*); besides these a small fragment of some thistle and a portion of the water ranunculus (*Ranunculus aquatilis*) were all that could be identified.—*H. Stevenson; Norwich, March* 16, 1858.**

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## *Notes on Scottish Lepidoptera in* 1855-6.* By R. F. LOGAN, Esq.

THE communication I have to-night to lay before the Society is, as its title imports, rather a collection of scattered notes than a regular paper. I shall first enumerate a few insects which were added, during the years 1855 and 1856, to the list of species occurring around Edinburgh; principally by the industry and energy of the Messrs. Wilson.

The first species on Mr. Wilson's list is Anisopteryx æscularia, of which he obtained a single male specimen from Corstorphine Hill, in the spring of 1855. It is probably frequently overlooked, like many other brumal and vernal species; but does not appear to be common in Scotland.

Eupithecia innotata. Of this scarce species the Messrs Wilson obtained one specimen near Morningside in 1855; and have hitherto been unsuccessful in their attempts to find more. The Rev. Joseph Greene, in a recent number of the 'Zoologist,' states, that he believes the food of the larva to be the ash (*Fraxinus excelsior*); and this is still further confirmed by Mr. Crewe, who states, in the 'Naturalist,' that he has taken it from that tree. Knoch, however, as quoted by Treitschke, says, that it feeds on the various species of wormwood (*Artemisia Absinthium, vulgaris* and *campestris*), living on the blossoms in the month of August, and varying in colour from green to brown.

The curious little Noctua, Euplexia lucipara, although known to occur in other parts of Scotland, had not apparently been observed near Edinburgh till the summer of 1855, when Mr. Wilson obtained a specimen on Corstorphine Hill; and I afterwards found several, in

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*** Read before the Royal Physical Society of Edinburgh.**

the larva state, on the Pentlands, in October, feeding on the common fern or braken (*Pteris aquilina*). These larvæ formed loose cocoons just under the surface of the earth, and produced the perfect insects in June, 1856.

In June and July, 1855, Dianthæcia conspersa was observed by the Messrs. Wilson, at Slateford and Currie, in which localities they afterwards found the larvæ in August, feeding on the seeds of Silene inflata, along with those of the rather scarce D. carpophaga. From these larvæ both species were reared in 1856; but those of D. carpophaga are not easily reared in confinement, and but few moths came to perfection. These are very different in colour from English specimens of the same insect, being much darker and less ochraceous in tint, and are no doubt a climatal or geographical variety.

The next species I have to mention is Demas Coryli, of which Mr. Wilson reared one male, from a larva found in the autumn of 1855. During last autumn Mr. Wilson and I found nine or ten more larvæ, so that the species does not seem so rare in the district as we had imagined it to be, although certainly less common than in many other parts of Scotland.

In 1856 the Messrs. Wilson added five species to the list. Lobophora lobulata was found among sallows near Penicuik, in April; and in the same locality, in June, Coremia ferrugata and C. propugnata occurred,—both common insects, but not before observed in the district. Thera variata (*T. coniferata*, Curtis; *T. simulata*, Guenée, Hüb.?) was reared in July, from rather short green larvæ, with white lines, found on juniper on the Pentlands, in June, along with the larvæ of Eupithecia sobrinata; and on the 8th of October I beat a specimen of the perfect insect from one of the juniper bushes, apparently indicating the existence of a second brood in the year, as in Thera simulata. Finally, Mr. Wilson found five or six larvæ of Clostera reclusa on Salix capræa, in Drumshorling Wood, near Broxburn, in the end of August: they were then full grown, and spun their cocoons in a day or two after they were placed in captivity.

Late in October, 1855, when the leaves were rapidly departing from the trees, I found the active, green, fusiform larvæ of Swammerdamia griseo-capitella, in abundance on the dwarf birches at Ravelrig Bog, along with the larvæ of Phlæodes frutetana; and forming circular mines in the birch leaves, somewhat like those made in the leaves of apple and pear trees by the brilliant little Cemiostoma scitella, were a few unknown larvæ of a Nepticula, which produced, in 1856, N. argentipedella, almost at the same time that Mr. Stainton bred the species from larvæ collected in England by Mr. Wilkinson. At the same time and place, a small larva was found mining in the birch leaves, and finally cutting out an oval case, in which it descended to the ground to complete its transformations. This curious little artificer produced, in June, Tinea bistrigella, an insect already in our list, but of which the transformations were unknown until the larva was detected in the south of England, in 1855, by Mr. Boyd.*

A single specimen of Scoparia pallida was taken in the marsh at the west end of Duddingston Loch, on the 11th of July, 1856; and on the 24th the larvæ of Notodonta ziczac, Hypermecia angustana and Chesias spartiata were found in the vale of the Heriot,—the two former on sallow, the latter on its natural food, the common broom.

The remaining species added during the two past seasons are—Gracilaria elongella, which is not scarce in many places during the autumn, and must feed on other trees besides the alder; Lithocolletis Scopariella, taken at Heriot, in July, among broom; Nepticula —— ? reared from mountain-ash, in the spring; N. anomalella, mining in the leaves of the China rose (*Rosa indica*), at Duddingston, and previously taken at Balgreen; and lastly, the old mines of Nepticula Tityrella have been detected this year, by Mr. Shield, in the leaves of a beech hedge, between Threipmuir and Balerno.

Early in May, 1856, I bred three specimens of Eupithecia helveticaria of Boisduval, from green larvæ found on the common juniper, on the Pentlands, in the autumn of 1855. I had met with the insect in former years, and suspected it might prove to be a new species. It was not until Mr. Doubleday sent specimens to M. Guenée, and thus ascertained that it was already named on the Continent, that I discovered I had overlooked Boisduval's description of the insect, which he says was bred by Herr Anderregg, in Switzerland, from larvæ found on Juniperus Sabina. The Messrs. Wilson found several of the larvæ on the Pentlands last autumn, some of which, from being kept in the house, produced the perfect insects in the month of February.

Another very interesting species of the genus Eupithecia was found in some numbers by the Messrs. Wilson, although it is not new to the district, having been taken near Edinburgh many years ago by Mr. Curtis; and one of its apparent varieties, on several occasions of late years, by Dr. Lowe and myself. I allude to the large and hand-some Eupithecia cognata. Having fortunately obtained the eggs of E. subfulvata,* from a worn specimen captured at Duddingston, at the same time that Mr. Wilson kindly furnished me with those of E. cognata, I have no hesitation in saying, from the results of a careful comparison of the larvæ in all their stages, that they are the same species, and feed on the same plant, the common yarrow (*Achillea Millefolium*). With regard to the other supposed variety, E. succenturiata, I can say nothing, as I have not seen the larva, which is said to feed on the seeds and flowers of Artemisia maritima. Should it prove to be the same species, the last mentioned, being Linneus's name, must be retained for the insect.

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* I have some slight doubts as to whether the larvæ found by Mr. Boyd are identical with those above mentioned.

In August and September many larvæ of Eupithecia assimilata were found at Duddingston, on black currant (*Ribes nigrum*). The insect stands already in our list, and had been bred by Mr. Wilson, under the name of E. minutata; but the latter species is said to feed upon heath, and to frequent uncultivated localities, while the former is always found in gardens.

During the autumn of 1855 I received a few eggs of Coremia olivata from the neighbourhood of Loch Rannoch: they hatched shortly after I received them, and the young larvæ fed on the different species of Galium, passing the winter without feeding, and commencing again early in the spring. The full-grown larvæ were dingy brown in colour and remarkably hispid, bearing no resemblance to Réaumur's "*Arpenteuse qui vit de feuilles du frêne.*" About the same time Mr. Wilson obtained the larvæ of Coremia munitata from the egg, but only one survived the winter: it resembled very closely the larva of C. montanata.

Having likewise received fertile eggs of Erebia blandina from Rannoch, I placed the young larvæ in a glass cylinder, having the upper end covered with a piece of muslin, and the lower end placed in a flower-pot containing several species of growing grasses, and exposed the whole to the weather in the garden. Here I had the satisfaction to perceive that the young larvæ throve apace, and before the hard weather set in they were about three lines in length, of the usual form peculiar to the Satyridi; and when resting, as they generally did, near the roots of the grasses, they resembled the withered sheaths so closely as to be almost undistinguishable. In this position five of them survived the winter, but the last of these died on the 19th May, 1856; and I have been still more unsuccessful in a second attempt, which I was enabled to make last autumn through the kindness of the Messrs. Wilson.

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* See 'Zoologist' for 1857, p. 5719.

In April, 1856, I received, from Perthshire, eggs of Petasia nubeculosa, Brephos Parthenias and Semioscopis Avellanella—all very interesting species to the systematic entomologist, from the positions they appear to occupy on the limits of the respective tribes to which they belong, each apparently possessing the characters of two of the principal divisions of the Heterocerous Lepidoptera. These involved affinities are fully borne out by the characters of the ova, which have been too much neglected as an aid to classification. Thus, the eggs of the Petasia are spherical and ribbed, like those of the Noctuina; and the young larva, when first disclosed, arches the central segments slightly in walking, like nearly all the larvæ of the Noctuina, before their second moult. The eggs of Brephos Parthenias, which Guenée places at the end of his first section of the Noctuina, are oblong-oval, smooth, and resemble the eggs of most of the Geometrina; while those of Semioscopis Avellanella are flat and scale-like, indicating a close affinity with the Tortricina. The young larvæ of Petasia nubeculosa were disclosed from the egg about the middle of May, and were then bluish-gray, with small dark tubercles and an amber-coloured head. They were very restless at first, and it was some time before they commenced to feed. They changed their first skin in about fourteen days, spinning a silken carpet on the leaf, in which they fastened their prolegs for security of position, and then appeared of a pale green, with three whitish lines, minute black tubercles, and translucent green head; the thoracic feet and a spot upon each of the prolegs black. They still looped slightly in walking, resting solitarily on the under sides of the birch leaves, with their heads stiffly recurved, like the larva of Endromis versicolor, and dropping, when suddenly alarmed, by a silken thread, which they used for the purpose of regaining their position when the supposed danger was over. In disposition they were most pugnacious and irritable, hitting and biting each other whenever they came in contact, and wandering restlessly about when disturbed. In consequence of these habits, several of them died from the wounds they received from their companions. The second moult was completed in eleven or twelve days, when the black tubercles became pale whitish yellow. After the third moult, which was again accomplished on the fourteenth day, the young larvæ were pale yellowish green, the hair-warts sulphur-yellow; an oblique lateral streak on the fourth segment, and a transverse bar on the twelfth segment, of the same colour; head unicolorous green; thoracic feet and a spot on each of the prolegs black. After this they did not appear to alter much in the succeeding moults, and I was prevented from completing my observations upon these interesting larvæ by the demise of the last one, before it was full grown; but some of the English entomologists were more successful, and, I believe, obtained the pupæ. R. F. LOGAN.

*Geographical Distribution of British Butterflies.*—The paper on this subject by Messrs. Boyd and More, at p. 6018 of the 'Zoologist,' is one of those careful and thoughtful papers which give me the greatest pleasure to receive and publish: it has, however, suggested a few doubts in my mind, the solution of which will, I am sure, be as interesting to my readers as to myself. In the first place, I feel a strong repugnance to adopting any theory of geographical distribution of insects that does not recognise as a primary postulate the abundant presence of suitable food, and, as a secondary postulate, suitable conditions of climate, whether as regards heat or moisture: thus, as a familiar illustration, I suppose that Brassicæ and Rapæ swarm in our London gardens, first, because we provide them so abundantly with suitable food, and, secondly, because they find the temperature of the London atmosphere conducive to their well being and increase. I cannot imagine that the clouds of white butterflies I sometimes see opposite my window are the descendants of a colony settled there some hundreds of thousands of years ago, but that they are attracted simply by the rows of cabbages, and I arrive at this conclusion because when the field is occupied by a crop that the white butterflies do not seek, I do not see them there. Again, for several years we had lucerne near us, and the field produced an abundant crop of Polyommatus Alexis, but now mangold wurzel has succeeded the lucerne, and Alexis has deserted us: surely in our theories we should allow margin for such obvious causes of the presence or absence of species. I may also observe that any conclusions drawn from data so obviously imperfect as those to which Messrs. Boyd and More have had access, while they aim at rigid truth, may convey a totally false impression. Thus I think that working entomologists would agree with me that the gloriously varied "Province" of "South Wales" was likely to prove the richest in butterflies of all the eighteen, and "Ouse," on account of its monotonous surface, to prove the poorest, but we find that the butterflies of "South Wales" stand at 0, those of Ouse at 59. In both instances the facts of the case are misstated, simply because the absence or presence of butterflies is inferred from the absence or presence of entomologists.—*Edward Newman.*

*Additions to Messrs. Boyd and More's "Geographical Distribution of Butterflies in Great Britain."*—

Anthocaris Cardamines. Area 15. Very plentiful at Fochabers.

Vanessa Antiopa. Area 13. Two specimens taken several years ago on the banks of the canal, not far from Paisley; one of these, a few years ago, was in the possession of a bird-stuffer in George's Street, Edinburgh.

Satyrus Tithonus. Area 11. Taken by myself at Morpeth: I believe it is also plentiful in the neighbourhood of Durham.

Area 6. This is without a single representative. Has no one visited this portion of South Wales who is able to supply any information?—*John Scott; Southfield Villas, Middlesbro'-on-Tees, April* 5, 1858.

*Deilephila Euphorbiæ not taken near Bridgewater.*—Having seen an erroneous statement that a specimen of D. Euphorbiæ, taken by the late Mr. Baker near Bridgewater, was still in the collection formed by that lamented naturalist, and having an opportunity of tracing the source of the error, by writing to the late Mr. Baker's friend and coadjutor, Mr. Clark, of Halesleigh, I find it is simply a misnomer, the insect in question being Deilephila Galii. Mr. Clark writes thus, "There is no specimen of Deilephila Euphorbiæ in the cabinet of the late William Baker, neither has that cabinet ever contained one; the species is D. Galii, and the similarity of the two species has probably led an incompetent observer into this error. Euphorbia Paralias grows to a great extent among the Burnham Sands, a mile or two northward of the mouth of the river Parrett, and William Baker used to remark to me that that one might expect to find the larva of Euphorbiæ there: we searched, but always in vain. There are two specimens of D. Galii in the late W. B.'s collection, and a third in that of the Taunton Museum: one of William Baker's was bred from a larva found by himself on the southern side of Bridgewater; of the history of the other two I know nothing." I fear that this beautiful insect must now be struck out of the British list, since it appears to have been extinct ever since the late Mr. Raddon's *razzia* among the spurge at Braunton Burrows.—*Edward Newman.*

*Capture of Endromis versicolor in Tilgate Forest.*—On Thursday, the 8th of April, in company with Messrs. Andrews and Tester, we made an expedition to the birch woods, further up this line, the usual haunt of E. versicolor, taking with us a bred female, which, notwithstanding the comparative dulness of the weather, proved such an attraction that, after plying four nets with great rapidity as long as the rain would allow us, we found we had captured between us 118 specimens, generally in fine condition. Sundry specimens of Brephos Parthenias and Ceropacha flavicornis completed our captures. To spare the trouble of application we had better add that, after supplying the wants of our numerous friends, we shall have no remaining duplicates.—*J. Eardley Hall; William Henry Draper; Keymer, Hurstpierpoint, April* 16, 1858.

[I hear that more than six hundred of this species were taken simultaneously with the above near Brighton.—*E. N.*]

*Note on the Breeding of Endromis versicolor.*—I succeeded in rearing twenty-eight specimens this year from thirty-six eggs and ten caterpillars, which I obtained last season. I kept the pupæ out of doors, during the winter, in a flower-pot covered with moss.—*J. E. Hall; Keymer, Hurstpierpoint, April* 16, 1858.

*Occurrence of Hadena peregrina of Treitschke in the Isle of Wight.*—Mr. Bond kindly lent me a Noctua, which he captured last summer on the coast of the Isle of Wight, to send to my friend M. Guenée for examination, and it proves to be, what I supposed it was, the Hadena peregrina of Treitschke. It is a common species along the shores of the Mediterranean Sea, and will probably be found here along the southern coast in those localities which Aporophyla australis inhabits. Mr. Bond's insect is slightly darker in colour than the Continental specimens which I possess.—*Henry Doubleday; Epping, April* 17, 1858.

*Larvæ of Tephrosia laricaria.*—Mr. Burney has given us most interesting information (Zool. 6029) concerning this previously unknown larva, but I am sure he will excuse my asking him to add how he recognises a larva of which no figure or description exists, indeed which no one had previously seen, and which he has not yet bred, to be that of Tephrosia laricaria? I may mention that I have a decided wish to prove the two species distinct; I neither desire to fuse such pairs of species, as

M. Guenée has done, nor to pooh! pooh! them, as mere relations of analogy, as Mr. Westwood proposes: these opposite conclusions remind me of opinions I have sometimes heard expressed of a very attractive lady, the young deciding that she was quite *passée*, the more mature that she was "ridiculously young;" but these views did not deprive the lady of existence, any more than the conflicting opinions of entomologists annihilate my isomyious pairs.—*Edward Newman.*

*Larva of Harpalyce sagittaria.*—Under this title Mr. Brown gives (Zool. 6030) a description of a larva reared from the egg; so far this communication is interesting; but how comes the writer to confound the name, which is derived from the beautiful sagittate mark on the fore wing, with the idea that the larva feeds on the Sagittaria? Is there any record or evidence of any kind that this arrow-marked insect feeds on the arrowhead? Such a coincidence would be most astounding. Would it not be well to try the larva of this insect, when again reared from the egg, with the various species of Chenopodium which occur in the neighbourhood where it is found? Will Mr. Bond, to whom Mr. Brown has alluded, obligingly give the readers of the 'Zoologist' what information he possesses on this subject?—*Id.*

*Occurrence of Pterophorus Lienigianus in Britain.*—In the course of the year 1857 Mr. Harding recorded, in the 'Zoologist' (Zool. 5437), the discovery of a Pterophorus in the following words:—"The larva was feeding on the under side of the leaves of the common wormwood; its presence is easily detected by the white appearance of the leaves; the larva is light green; full fed in June; imago out in July: it is very local, and far from common." Mr. Harding associates with this insect the name of similidactylus, but I cannot find the authority for this name. Mr. Doubleday, who has well examined the specimens, agrees with me that they differ from all our ascertained British species; and Mr. Stainton, having carefully compared it with Zeller's description of Pterophorus Lienigianus, in 'Linnea Entomologica,' vol. vi. p. 380, believes it identical with that species.—*Id.*

*Ants'-nest Beetles.*—Yesterday I made my first essay at examining an ants' nest for the tenant beetles, and was delighted with the new forms of life and habit revealed to me. I found a nest of Formica rufa, about a small cart-load, and sat myself down to examine it. The occupiers, or at least some of them, were lazily clearing out the entrances, reminding one of the preparations made for his expected guests by the landlord of a Highland hostelry; but I could not see any hexapod lodgers in this hotel: so I boldly thrust in my hands and lifted as much of the nest as I could into a large sheet of white paper. The first thing that surprised me was the heat of the nest, the temperature being very sensibly greater than that of my hands; but I had no leisure to think much about this, for I had to free my hands from the ants, which clung to them tenaciously, yet without biting, and while doing this the strong odour of formic acid was very perceptible. The ants swarmed out of the heap of wooden *débris* which lay in the middle of my paper: I swept them off with a bit of stick, and after repeating the process two or three times I began to move the material before me gently backward and forward, taking up the topmost and largest fragments, and throwing them back on to the nest. By continuing to do this I soon got free of most of the ants and the larger pieces of wood, and among the dusty remainder I saw a little tail curled up, which I knew must belong to a Staph.; so I wetted my finger and brought up the entire animal by *habeas corpus:* it was Leptacinus formicetorum. Presently I saw a speck shining like ore; I raised it from its degraded position, and recognised Dendro- pygmæus. Then a browner and smaller brother was visible—the rare Saprinus piceus, which was being trampled under foot by Thiasophila angulata. I spent nearly an hour over this handful of the nest, which proved the best I examined, and, after three hours took stock and found I had, in all—

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|---|---|
| Dendrophilus pygmæus | 12 |
| Saprinus piceus | 4 |
| Leptacinus formicetorum | 5 |
| Thiasophila angulata | 4 |
| Oxypoda hæmorrhoa | 2 |
| Othius ? sp. | 1 |
| Trichopteryx ? sp. | 1 |

I hope to go again and get more specimens and species, but I am desirous to put others on the search of the ants' nests in their neighbourhood *now*, because the process is not only more practicable than it will be later in the season, when the ants are more active, but it is probable the beetles are now more centralized than they will be later in the season. Every one will, for his own future chances of success, be glad to replace the materials he takes from the nest, remembering that it is not every nest that is productive of beetles.—*J. W. Douglas;* 6, *Kingswood Place, Lee; April* 3.—*From the* '*Intelligencer.*'

*Ants'-nest Beetles.*—"I am sorry to see that England, like France, 'openly preaches and elevates to a doctrine' ants'-nest ravaging. Of course there is a difference between taking a handful and sifting a nest: the teaching, however, is precisely the same, and when it is coupled with such success as yours, and recommended by a person of your entomological *status*, I feel confident the system will be disastrous to the occupants of the nests, both Hymenopterous and Coleopterous. Such examinations of ants' nests as you mention, when done tenderly, at this time of the year, may not produce much mischief, but if often repeated, at a more advanced season, when their different chambers are completed and occupied by larvæ and pupæ in their various stages, requiring various degrees of warmth, how are these conditions to be ensured if the hands of all the Myrmecophilous Coleopterists of the 'Great Babylon' are to be 'boldly thrust' into the nests of their pets, overturning the pillars and divisions of their house, letting in the roof, and putting all in confusion? This is what must occur if done in your style, and with the most gentle hands: what will be the fate of colonies operated upon by 'roughs?' It will be no less than spoliation, and you must be prepared for such scenes to be common, and all nearly equal to the Highgate performance, which must necessarily make Myrmecophilous Coleoptera first 'common,' soon 'rare:' who is there but laments the condition of 'the light loamy bank?' Now this is no fault of one or two persons, but the fault of a system, and I very much regret that you should have identified yourself with a system you may feel to be harmless, but which I think will soon prove otherwise." The foregoing is an extract from a letter I have received from a well-known collector, and as every subject is better for being seen on both sides, I have requested and received the writer's permission to publish his remarks. I am the last person to advocate the wanton destruction of any creatures, and in this case the disastrous consequences of the "system," I cannot but think, are greatly overstated, for I have seen nests of Formica rufa thoroughly and repeatedly stirred up by boys, and yet the ants flourished afterwards as much as ever. It is so clearly the interest of the collector not to destroy the nests, that I think no one will do that which will produce such an effect, but even if, regardless of consequences, any one were willing to exterminate the ants, I doubt if they would let him, so pertinacious and formidable are their attacks directly the weather gets warm. The solicitude recently evinced for the welfare of ants seems to me to be very singular. Water-beetles are taken out of their element by hundreds, moths are attracted to sugar and sacrificed by thousands, nay, whole broods of caterpillars are reared from the eggs, only that they may furnish "fine specimens" for collections, and not a word is said. But these sepoys of ants, the terror of all other insects, whose haunts and homes are strewed with the mangled remains of their victims, are selected and recommended to our special care and attention; why, it would be difficult to state, unless the sympathy for them be of that morbid kind which is exercised towards the greatest offenders. Certainly there is nothing in the manners of these ants to give them a preference in our affections over all other insects, and if it is wrong to hurt or disturb them, what may not other insects so remorselessly hunted complain of? But, gentlemen, be consoled: it is not necessary to do more than to take up and examine the loose bits of stick at the outside of the nest. I said before that my *first* handful was the best, and I have proved that the most of the beetles are to be obtained from the loose matter which the ants have carried up, and which it can do no harm to remove and replace. At this second search I took all the species I got on the first occasion, except the Othius, and in addition

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|---|---|
| Quedius brevis . . . . . . . . . | 3 |
| Monotoma angusticollis . . . . . . . | 3 |
| „ conicicollis . . . . . . . | 3 |

—*Id.*

Note on Holothuria.

*Note on Holothuria.*—In 1856 (Zool. 5181) I noticed that a Holothuria (*Pentacta pentactes*), in my possession, had voluntarily thrown off its tentacles, and did not appear to be incommoded by the loss. I have now the pleasure of adding that a new set of tentacles are forming, and that they have begun to bud out, pale and tender, to the extent of one-eighth of an inch. Reproductions of this kind are now so commonly known to occur that they are scarcely worth recording, unless, as in the present instance, one is able to give positive periods of time. I have notes of many other similar cases as occurring in my practice among other creatures. The water in the great glass jar, containing the Holothuria, has not been changed during the whole period.—*W. Alford Lloyd; 19 and 20, Portland Road, Regent's Park, London, W., April 5,* 1858.

### *Remarks on the Sale of the Entomological Society's Exotic Collection; a Letter addressed to the President.*

Oatlands.

Dear Dr. Gray,

I address you, as President of the Entomological Society, myself ignorant whether or not you had any hand in the somewhat remarkable proceeding which has just taken place. I ask you to use your influence with the Society to mitigate, as far as yet may be,—in one instance at least,—a wrong which they have done to all those who have contributed to their collection. I ask you to make over to the children of the late Mr. Stevens, of Bogotà, whatever sum the collections which he sent you may have sold for. Mr. Stevens, though a poor man, out of health and with children to provide for, made a great self-sacrifice to gratify his enthusiasm as an entomologist, that he might send you many rare insects, fondly hoping that he was conferring a present and future benefit upon the entomologists of his native country.

The sale of the collection in Paris was most disreputable, and I fear that you may apply the *tu quoque* to yourselves.

You have done that which may have a most injurious influence upon the welfare of other Societies. Who would be at the trouble and expense of sending some rare animal to the Gardens of the Zoological Society if there is a possibility that the object of his care may, by some freak of the Council, be sent to the hammer? You have done that which I believe to be neither lawful nor right. You are only life-tenants of the property which you have sold. Part of it had probably been so cherished through life by its possessor that he left it to your *care* to prevent its dispersion.

I am in total ignorance as to the promoters of this scheme, and therefore mean no personal affront to any one.

I am yours very truly,

W. C. HEWITSON.

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*Reply to the preceding by Dr. Gray.*

British Museum,

Dear Mr. Hewitson, April 20, 1858.

In reply to your note to me, without date, received this morning, I hasten to inform you that I have had nothing personally to do with the proceeding, and was not even on the Council when the subject was discussed. The resolution under which the sale took place was regularly conducted, and expressed, in a legal manner, the unanimous wish of the Society, and I believe that no wrong has been done to any one, the Society having selected and retained all the specimens which have been specially described from its collection. It is the general mistake of Societies of the kind to spread their exertions over too large a field, aiming at everything, and then finding that they cannot do any part well. Collections of insects, to be well kept, require one or more special curators, which the revenues of the Society will not afford to pay; the consequence is that the collections are not arranged so as to be useful for consultation, and get into a bad state; the library does not increase and is not catalogued, and the Secretary, however willing and industrious, is over-worked. The Society will therefore, I believe, derive great benefit from what it has done, as its officers will be able to give their exclusive attention to its meetings, publications and library, and make them more available to the members, and thus advantageous to the improvement of the Science.

I consider that the Society has every right to do as they have done, and every one of any experience in England or France must be fully aware that Societies of the kind cannot be considered as permanent institutions, and that their property must be liable to be distributed, like that of a private individual, though perhaps not as frequently. I do not suppose that you think that you or your executors are precluded from selling or otherwise parting with the specimens which have been presented to you by different collectors, and that their families should have any right to the proceeds of such sale.

If you feel so strongly on the subject it is much to be regretted that, as a member of the Society, you should not have objected before the sale was finished. The subject has been in discussion for several years; the resolution ordering the sale was passed at the anniversary meeting, January 28, 1856, more than two years ago; the sale was advertised in February last, and the catalogue distributed and sent to you at least fourteen days before the sale, and if you had then stated your objection, the evil (if it is any evil) might have been prevented, but as it is I fear that you must be considered equally in the wrong (if it is a wrong, which I deny) as the other members of the Society.

I am, dear Mr. Hewitson,
Yours truly,
John Edward Gray.

To W. C. Hewitson, Esq., M.E.S.

## *Proceedings of Societies.*

### Entomological Society.

*April* 5, 1858.—J. O. Westwood, Esq., V.P., in the chair.

### *Donations.*

The following donations were announced, and thanks ordered to be given to the donors:—'Proceedings of the Royal Society,' Vol. ix. No. 29; presented by the Society. 'The Zoologist' for March; by the Editor. 'Catalogue of British Coleoptera,' by G. R. Waterhouse, Esq , F.Z.S., &c., two copies, one of them printed on one side only; by the Author. 'The Literary Gazette' for March; by the Editor. 'The Journal of the Society of Arts' for March; by the Society. 'Exotic Butterflies,' Part 26; by W. W. Saunders, Esq., F.R.S., &c. 'Stettiner Entomologische Zeitung,' xix. jahrgang, Nos. 1—3; by the Entomological Society of Stettin. 'The Entomologist's Weekly Intelligencer,' Vol. iii.; the same, No. 79; by H. T. Stainton, Esq. 'The Athenæum' for February and March; by the Editor. A pair of Carabus intricatus, *Linn.*; by J. J. Reading, Esq.

### *Election of Members.*

Alexander Wallace, Esq., of Bembridge, Isle of Wight, and H. G. Knaggs, Esq., of Maldon Place, Camden Town, were balloted for and elected Members of the Society.

### *Exhibitions.*

Mr. Stevens exhibited a specimen of Papilio Ulysses, taken by Mr. Wallace in Aru, and observed that Mr. Wallace saw this species on the wing almost daily during his three months' stay in the island, but, owing to its high and rapid flight, he only succeeded in capturing two examples.

Mr. Janson exhibited various Coleoptera, handed to him for that purpose by Mr. Douglas, which had been recently taken by that gentleman in nests of Formica rufa; the species most noteworthy were Saprinus piceus, *Ill.*, Dendrophilus pygmæus, *L.*, Leptacinus formicetorum, *Maerk.*, and Thiasophila angulata, *Erichs.*

Mr. Janson also exhibited a specimen of Harpalus servus, *Duft.*, which had been detected by Mr. H. Squire among a number of unset Coleoptera presented to him by Mr. F. Smith, by whom they were captured, near Deal, last autumn. He observed that Mr. Squire, who had identified this insect, considered it specifically identical with Harpalus maritimus (*Kirby*), *Steph. olim* (subsequently sunk, in the 'Manual,' as synonymous with H. complanatus, *Sturm.*), as he found the individual exhibited agreed precisely with the specimens thus denominated in the Kirbyan, Stephensian and Leachian cabinets. Mr. Janson remarked that he had not himself yet had an opportunity of following Mr. Squire's investigations in this matter; he was therefore not competent either to confirm or contradict the view he advanced.

Mr. Janson likewise laid before the Meeting the following, which he had recently taken:—

*Ocyusa ruficornis*, Kraatz, Naturgesch. d. Ins. Deutschl. ii. 158, 2 (1856), a species not previously recorded as an inhabitant of Britain, and indeed only recently discovered by Dr. Kraatz, near Berlin. It has also been taken in the vicinity of Paris, and is described by MM. Fairmaire and Laboulbène in their 'Faune Entomologique de France,' i. 441, 33 (1856), under the name of Oxypoda fulvicornis: the specific title imposed by Dr. Kraatz will, however, stand by right of priority, his description being anterior in publication by several months. The present species may be at once distinguished from its near ally and as yet sole congener, O. maura, *Erichs.*, by its superior size, brown hue, longer antennæ, and by the bright brownish red colour of those organs and of the legs; other, less apparent, differences exist in the form of the thorax and in the sculpture and pubescence of the elytra, &c.

*Hygronoma dimidiata*, Grav., Erichs., Steph.

*Stenus picipennis*, Erichs., first discovered and identified by Mr. Edwin Shepherd, in the autumn of 1857, and subsequently taken, he had heard, by Dr. Power, in Hampshire.

*Ischnodes sanguinicollis*, Panzer (*Ctenicerus sanguinicollis*, Steph.). The female, which differs somewhat in size and form from the male, is unquestionably Sericosomus fulvicollis of Stephens.

In answer to a question of Mr. Westwood, relative to the localities in which these insects had been found, Mr. Janson stated that he had captured the last-named species in the London district; in respect to the other three, he was not certain whether the locality was situate within that limit or not,—at all events he might venture to say one of the home counties South of the Thames; this he considered quite sufficient for all scientific purposes, and most respectfully declined henceforth publicly to indicate the precise localities of his captures, an announcement which appeared to afford much amusement to some of the Members, as it was greeted with considerable hilarity.

Mr. Waterhouse exhibited the following species of Coleoptera, believing they had not hitherto been recorded as British, *viz.:*—

*Hister marginatus*, Erichs. Two specimens of this insect had come under Mr. Waterhouse's notice, one specimen in his own collection, and one in that of Dr. Power. The localities in which they were found are unfortunately unknown.

*Saprinus immundus*, Gyll. One specimen taken by Mr. Waterhouse, at the mouth of the Orwell, in September, 1855, and several specimens taken by Dr. Power and Mr. F. Smith, at Deal.

*Saprinus metallicus*, Fabr. Two specimens taken at Deal by Mr. F. Smith. This insect is given as British by Mr. Stephens, but he had mistaken the S. rugifrons, *Payk.*, for the species.

*Abræus* (*Acritus*) *nigricornis*, Ent. H. Found in the months of May and June in the corridor of the Crystal Palace.

*Calodera riparia*, Erichs. A single specimen taken by Dr. Power at Holme Bush.

Mr. Waterhouse also exhibited a specimen of a Plegaderus, which he supposed to be the P. dissectus, *Erichs.*, and stated that it was one of two specimens found in Windsor Forest by Mr. Samuel Stevens: a notice had already appeared relating to the discovery of the insect by Mr. Stevens, and Mr. J. F. Stephens, who published this notice in the 'Zoologist,' had regarded the insect as Abræus vulneratus, *Kug.*

Mr. Waterhouse then proceeded to describe four species of Staphylinidæ, which he believed to be new:—

### OXYPODA NIGRINA.

O. *Nigra, opaca, sericeo-pubescens, pedibus fuscescentibus, corpore fusiformi, supra confertissime punctulato.* Long. 1 lin.

Very close to Oxypoda cuniculina, *Erichs.*, but rather smaller and usually of an uniform sooty black colour; the antennæ rather shorter, the terminal joint comparatively short and obtusely pointed; the elytra rather less strongly notched at the posterior outer angle; the tarsi (more especially the posterior pair) shorter. Head about one-third narrower than the thorax, rounded, convex; the parts of the mouth dusky; antennæ about as long as the head and thorax, gradually increasing in width to the apex, the last joint decidedly the shortest; first and second joints moderately elongate, obconic, and nearly equal; third joint about half the size of the preceding; of the remaining joints the first two or three are quadrate or nearly so, and the remainder (with the exception of the last) distinctly transverse. Thorax gradually contracted from the base to the fore part, the sides and the posterior margin gently rounded; above convex and even, or with a very indistinct dorsal furrow. Elytra about one-fourth longer than the thorax and rather broader, the puncturing fine, and, being extremely dense, produce a dull appearance. Abdomen attenuated and also very finely and densely punctured, the last segment and the edge of the preceding one often fuscous. Legs more or less dusky, with the knees and tarsi fusco-testaceous.

I met with this insect at Charlton in June, 1856, and at Erith in July, 1855, and some other localities not distant from London; it is also found in Scotland, Mr. Morris Young having taken it at Paisley.

### OXYPODA NIGRO-FUSCA.

O. *Fusco-nigra, thorace, elytris, abdominisque apice fuscis; pebidus testaceis; corpore fusiformi, supra confertim subtilissime punctulato.* Long. 1 lin.

It was with some little hesitation that I ventured to separate this species from O. hæmorrhoa, *Mannerheim*, so much does it resemble that insect in size and form, as well as in the structure of the antennæ; the fuscous thorax and elytra I at first thought might only be indications of immaturity; I found, however, that all the specimens which presented this colouring had the thorax dull, whereas in O. hæmorrhoa the same part is somewhat glossy, and upon placing the two insects side by side under a low power in the microscope, I soon perceived that the punctuation of the thorax was much more dense in the insect I call O. nigro-fusca.

Found in the *débris* left upon removing a stack of faggots in Bishop's Wood, near Hampstead.

### HOMALOTA PLUMBEA.

H. *Plumbeo-nigra, opaca, griseo-pubescens, creberrime subtilissime punctata; antennis fuscis, pedibus fusco-testaceis; thorace subquadrato coleopteris multo angustiore; abdomine nitidiusculo.* Long. 1½ lin.

This species should be placed in Kraatz's second section, near to the Tachyusiform species, such as Homalota labilis, &c., in which the elytra are ample, distinctly broader than the thorax. It reminds one of H. incana, *Erichs.*, agreeing pretty nearly in size, form, and colouring with that insect, but it is much more thickly and finely punctured, and the antennæ are longer, and none of the joints are decidedly transverse; the legs, moreover, are paler. Head rather narrower than the thorax, convex and rounded, but with the eyes slightly prominent, and the parts of the mouth rather produced, the surface, like that of the thorax and elytra, of a somewhat dull and silky appearance, owing to the thickness and fineness of the puncturing, combined with a tolerable dense and fine ash-coloured pubescence; palpi and antennæ dusky, the latter sometimes, with the base, dirty testaceous; they increase very slightly in thickness towards the apex; the first three joints considerably elongated and very nearly equal; of the following joints the first are rather longer than broad, and the penultimate quadrate; the terminal joint nearly equal in length to the two preceding taken together. Thorax subquadrate, slightly emarginate in front; the sides presenting a very gentle sigmoid curve, being a little dilated and rounded towards the fore part and slightly contracted behind; posterior margin rounded, posterior angles obtusely rounded; anterior angles rather acute; upper surface moderately convex, and with a somewhat large and shallow depression behind. Elytra ample, fully one-fourth longer than the thorax, and nearly twice as broad. Abdomen growing rather broader towards the hinder part, very thickly and finely punctured throughout. Legs testaceous; the femora and tibiæ more or less suffused with brown. I can perceive no differences indicative of sexes in the specimens before me.

Found by Dr. Power, at Seaford, near Newhaven.

### HOMALOTA IMBECILLA.

H. *Linearis, subdepressa, subtiliter pubescens, nigra, nitidiuscula, antennis pedibusque fuscescentibus, ano elytrisque testaceis, his basi fuscis; thorace transversim subquadrato; abdomine supra omnium crebre punctato.* Long. 1⅓ lin.

Head very little narrower than the thorax, rounded and moderately convex, very finely and rather thickly punctured; antennæ, if bent back, reaching about to the apex of the elytra; slender and with no perceptible increase in thickness towards the apex; the penultimate joints as long as broad; the middle joints longer than broad; the terminal joint nearly as long as the two preceding joints taken together; palpi fuscous, paler at the base. Thorax subquadrate, slightly broader than long, straight in front, very gently rounded at the sides, and more distinctly rounded behind; above gently convex, very finely and thickly punctured, and with a shallow fovea behind. Elytra scarcely longer and very little broader than the thorax, and very thickly and rather finely punctured. Abdomen with all the segments thickly and finely punctured; the punctures, however, on the terminal segments are a little less dense than on the basal; from the apex of the abdomen spring numerous longish hairs. First joint of the posterior tarsi a trifle longer than the second.

I found several specimens of this insect under *rejectamenta* at the mouth of the Orwell, in September, 1855. It is a soft and delicate little insect, and subject to considerable variation in colouring, chiefly in the elytra, these being sometimes entirely pale and sometimes entirely pitchy, but usually they are dusky at the base, and this dark colour is more or less extended in different individuals; the apex of the abdomen is always pale.

H. imbecilla, together with H. fluviatilis, *Kraatz*, H. cambrica, *Wollaston*, and H. thinobioides, *Kraatz*, may be grouped together as linear species allied to H. elongatula, but distinguished by the abdomen being thickly punctured throughout.

H. fluviatilis—or rather an insect (found on the banks of the Thames, near Hammersmith, by Mr. Squire) which I suppose to be the species so named by Kraatz—approaches the nearest to H. elongatula, but differs in being rather smaller, in having the body black throughout, the antennæ dusky (or impure black) to the base, the head rather narrower and less rounded, the sides being nearly parallel, and the thorax rather longer.

H. imbecilla is about equal in size to the smallest specimens of H. elongatula; the antennæ are longer and more slender than in that insect, sometimes fusco-testaceous throughout, and sometimes entirely dusky; the legs of a less bright and clear colour, being more or less suffused with brown or dusky at the base.

H. cambrica is very like H. imbecilla, but its form is more slender, its elytra are longer, and the punctuation is finer and more dense; that on the thorax and elytra, indeed, is so delicate as to be scarcely perceptible under a strong Stanhope lens, whilst in H. imbecilla the puncturing throughout is tolerably distinct.

H. thinobioides is the smallest of the group and the most slender in its make, but very like H. cambrica: its colouring is darker, and the punctuation of the abdomen is still more dense.

This note is made upon specimens from Madeira, given me by Mr. Wollaston.

Mr. Westwood remarked the admirable manner in which the Abræus exhibited by Mr. Waterhouse was set, every tarsus being spread out. Mr. Waterhouse thereupon informed the Meeting that the plan he adopted to set out small Coleoptera, of this and some other families, was to gum the insects slightly down on their backs (using gum Arabic for this purpose): the legs, &c., were then readily spread out with a camel's-hair pencil, after which the insect was easily removed by gently inserting the point of a pen-knife under it, and then placed in its proper position on gummed card: by this simple process many species could be set out, of which it is otherwise almost impracticable to display the limbs.

Mr. Waterhouse also detailed another plan, which he had found very useful, in setting out those tribes of small Coleoptera in which the limbs are rigid, such as the Curculionidæ, &c., *viz.* to gum the insects on card, without attempting to set out the legs, &c., until the gum has dried, when by slightly moistening the limbs, on one side of the insect only, they were very readily brought to their required position with the setting needle, and, on their again becoming dry, the other side could be treated in a similar manner; by gumming out several insects at once no time need be lost, as whilst one specimen was under process, the others would be drying.

Mr. Tegetmeier exhibited a newly constructed bee-hive, which consisted of two or more boxes, designed to be placed one above the other, each one furnished with moveable bars, to which the combs are attached, thus affording great facility for the removal of the latter, either for the purpose of scientific research, the partial deprivation of honey, or the artificial production of swarms. The bars are retained in their places by long wooden slides passing between them, which obviate the necessity for covers, enable a single bar of comb to be removed without disturbing those remaining, and permit the removal of the top boxes to be most readily accomplished. The boxes are square in form, and so constructed that bars of brood or honey-comb can be easily transferred from one to another.

Some discussion having arisen relating to the construction of the cells of the hive bee, Mr. Waterhouse stated that he was of opinion that the hexagonal form of cell was accidental, so far as the constructors of the cell were concerned; and, having been called upon to explain his views, he proceeded, in the first place, to call attention to the fact that if a number of cylinders of equal size were packed close together, side by side, each cylinder would be surrounded by six others; that, assuming the cylindrical form (or at least a form of cell approaching more or less to the cylindrical, and having a circular section) was the type form of isolated cells constructed by different kinds of bees, and that, in the case of the hive bee, a number of insects worked together, first depositing a small portion of wax, then excavating a small circular cavity in the same, for the commencement of a cell; this then being followed by the deposition of more wax and the excavation of more cavities, and these being placed close to the first; then neither of the cells could be constructed of their natural diameter, provided the first cavity formed had not attained the full diameter of the complete cell. The diameters of the cells would intersect each other; but, if partitions be left between them, the cell must be six-sided, if the cells remain equal in size. In order to make the idea more clear, he (Mr. Waterhouse) would assume for a moment that it were a law that a number of equal-sized circles, being packed closely together, side by side, and that each circle was then surrounded by seven others; he believed that the cell of the hive bee would, in that case, have been seven-sided. Such were the views entertained many years back by Mr. W., and published by him in the 'Penny Cyclopædia;' and having subsequently had his attention particularly directed to the subject, whilst examining the nests of a vast number of Hymenopterous insects, he still believes those views to be essentially correct. He now, however, has reason to believe that it is not absolutely necessary for the supposed natural diameters of the cells to intersect before an angular-formed cell would be produced. The instinct which leads an insect to excavate, in order to form a cell, may lead it to excavate beyond what would be necessary to form a sufficiently large cell, in the case of an insect, which, under ordinary circumstances, burrows until it comes in contact with an adjoining cell. Contact with other cells was the essential condition which influenced the angular form of any particular cell. It has been brought as an objection to his theory, Mr. W. went on to say, that, in the case of the wasp or hornet, a single female insect constructs hexagonal cells. This is true, but the same principle obtains,—no wasp builds a single, isolated, hexagonal cell; when wasps, or allied Hymenoptera, build hexagonal cells, many cells are built almost simultaneously, the first cell has made the least possible progress before six other cells are commenced around it, and these again have progressed very little before others are commenced external to them and in their interstices, so that a wasp's cell may be said to be altered into the hexagonal form as it proceeds, excepting in the case of the outermost series of cells, where only the inner side of each cell is angular, the outer side being almost always rounded. Mr. Waterhouse said he had possessed a very small nest of a hornet which consisted of three cells only; it was built in a small cavity adjoining a large nest, and where there was not room for more than three cells; they were circular externally and angular internally,—that is to say, each cell had two straight sides where it came in contact with two other cells, and was rounded elsewhere.

Mr. Tegetmeier remarked that he possessed a small piece of honey-comb which presented the same peculiarities.

Mr. Tegetmeier added that he had found it a great improvement to have double glass to observatory hives.

In answer to a question from Mr. Lubbock, Mr. Tegetmeier stated that he had not made any observations, confirmatory or otherwise, of the theories advanced by Professor Siebold, relative to the reproduction of these insects.

Mr. Murray observed, with reference to this subject, that Professor Simpson had transferred eggs from drone to queen cells, and that a larva produced therefrom grew so large that at length it reached the glass of the observatory hive in which the experiment took place, and then died: he thought it would be interesting to have this grub dissected, in order to ascertain whether it was a female or not.

Part 7 of Vol. iv., new series, of the Society's 'Transactions' was on the table.—*E. S.*

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## NORTHERN ENTOMOLOGICAL SOCIETY.

*March* 27, 1858.—B. COOKE, Esq., President, in the Chair.

### *Election of Members.*

T. P. Marrat, of Liverpool, and James Thompson, of Crewe, were elected Members.

### *Exhibitions.*

Capt. Cox, of Fordwich House, sent for exhibition three volumes, containing drawings from life of Lepidopterous larvæ upon their food-plants, by Mrs. Cox: the accuracy and beauty of the drawings were much admired.

Mr. Greening exhibited a box of Stegoptera, *Newman*, captured near Warrington, and at Llanferras, North Wales, in 1858: amongst them were specimens of Hydropsyche tenuicornis and H. angustata, Polycentropus subpunctatus, Leptocerus interruptus, male and female, L. quadrifasciatus, Melanna nigripalpis, Phryganea varia and P. grandis, Helisus hieroglyphicus, Limnephilus binotatus, L. notatus, L. præusta, &c., and called attention to this beautiful and interesting order, observing that "the more we saw of Newman's 'roof wings' the nearer we should place them to his 'scale wings,' as described in the 'Insect Hunters.'"

A Member observed, he had seen some foreign Stegoptera, which few men could separate from Lepidoptera, and which he should have pronounced 'scale wings' if they had been set.

Mr. Greening also exhibited a fine Cicada hæmatodes, taken in the New Forest by Mr. Bond, and specimens of Trogosita mauritanica, taken at Warrington.

Mr. Kendrick exhibited a box of Coleoptera and Ichneumonidæ, captured around Warrington, containing some rare species, and all particularly interesting as illustrative of the Fauna of the district.

A discussion ensued on the advisability of Members exhibiting local captures irrespective of rarity, and it was generally admitted that though very rare species might interest naturalists at the top of the tree more than the ordinary run of captures, yet, as a rule, more information was disseminated by one good box of local captures, however common some of them might be, than by a single species, however rare.

A Member observed that this seemed to him the great oversight at all the Natural-History Society Meetings which he had attended,—the object of the exhibitors seemed to be to bring something the President and Vice-President alone could appreciate, forgetting that there were always young naturalists and members from a distance present to whom their common local species would prove a feast for the eyesight.

The President exhibited specimens of Acheta sylvestris, captured in the New Forest: also specimens of Ctenophora bimaculata, Sarcophaga lineata, &c., bred this spring.

The Rev. H. H. Higgins exhibited a large box of local Diptera, captured within twelve miles of Liverpool Exchange: this interesting exhibition admirably illustrated the remarks which had been made by other Members upon this subject.

Mr. Higgins then called attention to some dead hive bees, which had been sent to him to ascertain the cause of death: he had found the spores of Fungi within them, but it was observed that the Fungi formed after death, and little doubt was expressed that the loss of the hives arose not so much from Fungi as from placing the hives in a bad winter situation, either where the hives had the sun upon them at some part of the day, or where the air was damp and ventilation bad.

A Member, once an unfortunate bee-keeper and afterwards a successful one, observed that he used to lose many light hives, which, as in this case, might be attributed to Fungi: hives of from 37 to 40 ℔s. could only just support themselves through the winter, if left in the summer quarters; whereas, he found, if placed behind a wall with a northern aspect, where the wind was free to blow upon them, and where the sun never could shine upon them for a moment, Fungi never appeared even in the few bees which inevitably die during winter, and the hives lost a very small per centage of weight, and came out strong in bees as in honey when placed in summer quarters again: this fact was now generally known to apiarians, but unfortunately farmers were slow to believe it.

The Secretary, on behalf of Mr. Parfitt, of Exeter, exhibited Latridius filiformis (n. s.), Anommatus duodecemstriatus and Leptogramma Parisiana (bred); also a box of Coleoptera, from the Rev. A. Matthews, containing Trichopteryx sericans, *Heer*, T. pygmea, *Erich.*, and T. curta, *Gyll.*, Ptilium angustatum, *Erich* , P. Kunzei, *Heer*, and P. excavatum, Ptinidium apicale, *Erich.*, and P. pusillum, and read a letter from Mr. Matthews, informing the Meeting that he had recently found two genera new to the British list, and which he had described in the April number of the 'Zoologist' (Zool. 6032).

The Secretary then exhibited two beautiful varieties of Hadena Atriplicis, recently presented to him by Mr. Doubleday, and a Continental specimen of Abraxas pantaria, and read Mr. Doubleday's remarks upon this species.

Mr. Gregson exhibited a box of Coleoptera, captured during the winter, principally in the "North and South Reserves" at Birkenhead, observing that those who desire to work up the Geodephaga and Brachelytra should lose no time, as the "Reserves" (formerly the bed of Wallasey Pool) are no longer reserved, but intended to be converted into docks forthwith. He also exhibited Rhyzophagus bipustulatus alive, taken at Garston, whilst waiting for a train: this little beetle had entirely destroyed some of the fir trees in the plantations around.

The Secretary then read the following, at the request of Mr. Douglas:—

### *Metamorphotic Systems of Classifying Insects.*

"I am not going to write an essay on this subject, but as the President, at the Meeting on the 26th of December last, as reported in the 'Zoologist' for February (Zool. 5951), has proposed a system of classification founded on metamorphosis, I just venture to say a word thereon. The principle of adopting the differences of metamorphosis in insects as a basis for dividing them into orders is not new, having been employed by Swammerdam, Lamarck, Oken and others, and the particular method now brought forward differs in no material respect from that proposed by Newman, in a paper read before the Linnean Society in 1834, published in the third volume of the 'Entomological Magazine,' subsequently modified by the author in his 'History of Insects,' p. 76, in the 'Zoologist' for 1853 (Zool. App. p. clxxxv.), and in the 'Insect Hunters,' pp. 10—13. The only difference that I can see is that Mr. Cooke mixes the Amorpha and Necromorpha, and gives the name Trichoptera to that portion of the old Neuroptera which Newman has separated under the name of Stegoptera. I do not propose to discuss the truth of the system propounded, but supposing the theory adopted by Mr. Cooke to be right in principle, then it is a manifest retrogression from that proposed on the same principle by Newman, and I think it is only right that author should have the credit of whatever merit may be due to the original propounder of the system."

The President disclaimed all desire to take to himself any credit due to others; he had perhaps attributed to Mr. Dallas that which was due to Mr. Newman, but he was the last man to sully the motto of the Northern Entomological Society, "Honour to whom honour is due." He then read the following paper in reply to Mr. Douglas:—

"I beg to be allowed a word in reply to the remarks which have just been read.

"Of Mr. Newman's treatise, published in the 'Entomological Magazine,' I have seen no more than the short abstract given in Westwood's 'Modern Classification.' The article "Proposed Division of Neuroptera into two Classes" (Appendix to the 'Zoologist' for 1853), I read at the time it was published; but, not paying much attention to the subject then, I did not look at it again until my attention was called to it last month: I must own that I had completely forgotten it.

"The 'Insect Hunters' I did not see until after my paper was read at our last Meeting, and knew no more about it than what I was informed by the wrapper of the 'Zoologist' for December.

"Mr. Newman applies the name Stegoptera to the order containing the Trichoptera: I think it is a decided improvement, and shall adopt it. I ought also to have used the termination *ina* where a tribe or group of families was intended, as Staphylinina, Phryganeina.

"For the application of the name Trichoptera Mr. Douglas is ready enough to find fault with me, but he is apparently blind to a defect of the very same kind in his friend: in the order Hemiptera Mr. Newman includes the Cicadina, Coccina and Aphidina, which are no more hemipterous than the Panorpina are trichopterous.

"Mr. Douglas says that I mix the Amorpha and Necromorpha. I suppose he means this: that in my plan of arrangement the first and second orders have the pupa necromorphous, the third and fourth amorphous, and the fifth, the Stegoptera, necromorphous. If Mr. Douglas will examine Newman's arrangement of the Diptera, identical with Walker's, I think he will there see that the word 'mix' may be used with more propriety. In that arrangement the single tribe Stratiomina, of comparatively small extent, having the pupa obtected, is placed between tribes of considerable extent, having the pupa extricated.

"But, with regard to the order Stegoptera: I place it close to the Lepidoptera; Mr. Newman places it close to the Coleoptera (with which I see very little affinity), and removes it as far from the Lepidoptera as his system will admit of. Now, let us see what he says in reference to a great portion of this order. In the Preface to the 'Zoologist' for 1857 Mr. Newman asks this question, 'Why is not the entire tribe of Phryganeina lepidopterous? The cased larva is no objection; *the form of pupa is no objection.*" I need not quote any more; surely there can be no objection to placing the Stegoptera close to the Lepidoptera. Yet it is on this ground, if I have understood him rightly,—and I do not see how I could have misunderstood him,—that Mr. Douglas makes the positive and authoritative assertion that my plan of arrangement is a 'manifest retrogression.'

"But Mr. Douglas is anxious that Mr. Newman should have the credit of whatever merit may be due to the original propounder of the system: I am glad to have the opportunity of saying that in this I most cheerfully and heartily concur."

An animated discussion followed the reading of the President's paper.

Attention was called to Mr. Reading's notes on the modes of capturing Carabus intricatus, &c., in the 'Zoologist,' so different to the usual announcements of captures, which were generally mere trumpets sounded by the writers, and gave no practical information to other naturalists.

The attention of the Meeting was also called to the 'Insect Hunters,' by Newman, a Member observing that it was the first book from any author who seemed to understand the art of teaching Natural History pleasantly, particular stress being laid upon the advisability of all young naturalists acting up to the text of the valedictory chapter.

A vote of thanks being passed to all who had contributed to the pleasure of the evening, especially to the lady of Captain Cox, the Meeting separated.—*C. S. G.*

24 JU 58

# CONTENTS.

PROCEEDINGS OF SOCIETIES.—Zoological Society, 6041.

On Reason and Instinct, *Rev. J. C. Atkinson, M.A.*, 6043.

QUADRUPEDS.—Notes on the Hedgehog, *Major Spicer*, 6055. Note on the early breeding of Squirrels, *W. C. Hewitson, Esq.*, 6058.

BIRDS.—Occurrence of the Peregrine Falcon in Yorkshire, *Joseph Richardson, Esq.*, 6058. Early appearance of the Hobby in Norfolk, *H. Stevenson, Esq.*, 6058. Early arrival of the Blackcap; Early nesting of the Longtailed Titmouse, *W. C. Hewitson, Esq.*, 6058, 6059. Does the Male Partridge assist in Incubation? *Rev. J. C. Atkinson, M.A.*, 6059. Supposed Variety of the Partridge, *Warin Kidd, Esq.*, 6059. Occurrence of the Little Bustard at Gorleston, Suffolk, *H. Stevenson Esq.*, 6059.

INSECTS.—Notes on Scottish Lepidoptera in 1855-6, *R. F. Logan, Esq.*, 6060. Geographical Distribution of British Butterflies, *Edward Newman*, 6065. Addition to Messrs. Boyd and More's "Geographical Distribution of Butterflies in Grea Britain," *John Scott, Esq.*, 6065. Deilephila Euphorbiæ not taken near Bridgewater, *Edward Newman*, 6066. Capture of Endromis versicolor in Tilgate Forest *J. Eardley Hall, Esq., and William Henry Draper, Esq.*, 6066. Note on th breeding of Endromis versicolor, *J. E. Hall, Esq.*, 6066. Occurrence of Haden peregrina of Treitschke in the Isle of Wight, *Henry Doubleday, Esq.*, 606 Larva of Tephrosia laricaria; Larva of Harpalyce sagittaria; Occurrence of Ptero phorus Lienigianus in Britain, *Edward Newman*, 6067. Ants'-Nest Beetle *J. W. Douglas, Esq.*, 6067, 6068.

RADIATA.—Note on Holothuria, *W. Alford Lloyd, Esq.*, 6069.

Remarks on the Sale of the Entomological Society's Exotic Collection: a Lett addressed to the President, *W. C. Hewitson, Esq.*, 6069. Reply to the precedin *Dr. Gray, F.R.S., &c.*, 6070.

PROCEEDINGS OF SOCIETIES.—Entomological Society, 6071. Northern Entomologic Society, 6077.

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*Alcucis pictaria.*—A great number of this Geometra have been taken on Dartfo Heath between the 21st of April and the end of the month.

*Deilephila livornica.*—One specimen at Exeter.

Papers from Mr. Doubleday, Mr. Edward, Mr. More, Mr. Rogers, Rev. J. C. Atki son, Mr. Rodd, &c., have been received, but are too late for insertion: a long a interesting paper on the Tzetze will also appear in the June number.

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Herrich-Schäffer's 'Synonymic List of European Lepidoptera' is on sale at t office, price 7*s.* or 7*s.* 6*d.* by post. The same Entomologist's priced Catalogue is a here, price 10*d.* prepaid.

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